

# CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: October 22, 2021

TO: Holly Heldstab – WCR/Eau Claire

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for the Ellsworth Wastewater Treatment Facility  
WPDES Permit No. WI-0021253

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Ellsworth Wastewater Treatment Facility in Pierce County. This municipal wastewater treatment facility (WWTF) discharges to Isabelle Creek, located in the Trimble and Isabelle Creek Watershed in the Lower Chippewa River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD <sub>5</sub>			30 mg/L	20 mg/L		1
TSS			30 mg/L	20 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen						
April	7.6 mg/L		<b>7.6 mg/L</b>	6.1 mg/L		3
May – September	8.4 mg/L		8.1 mg/L	3.2 mg/L		
October – December	6.8 mg/L		<b>6.8 mg/L</b>	<b>6.8 mg/L</b>		
January – March	6.8 mg/L		<b>6.8 mg/L</b>	6.1 mg/L		
Fecal Coliform				400#/100 mL geometric mean		1
Chloride						
Concentration limit			400 mg/L	<b>400 mg/L</b>		3,4
Mass limit			1,194 lbs/day			
Wet weather mass limit			2,632 lbs/day			
Phosphorus						
LCA Interim Limit				0.9 mg/L		5
HAC Interim Limit				0.8 mg/L		
Final WQBEL				0.225 mg/L	0.075 mg/L 0.22 lbs/day	
Total Nitrogen			10 mg/L			1
TKN, Nitrate+Nitrite						1,2

Footnotes:

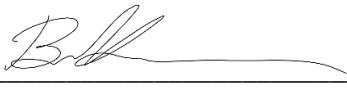
1. No changes from the current permit.
2. Monitoring only.

3. Limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
4. These are the WQBELs for chloride. A wet weather mass limit of 2,632 lbs/day is also required.
5. Under the phosphorus MDV, a level currently achievable (LCA) interim limit of 0.9 mg/L should be effective upon permit reissuance. A compliance schedule may be included in the permit until the highest attainable condition (HAC) limit of 0.8 mg/L can be met. The final WQBELs remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average, as well as a respective mass limit of 0.22 lbs/day (six-month average).

Chapter 1.11 *WET Testing of Minor Municipal Discharges* in the WET Guidance Document (2019) was consulted because this facility is a minor municipal discharge. No WET testing is recommended because this discharge is comprised solely of domestic wastewater, with no history of WET failures and no toxic compounds detected at levels of concern.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Benjamin Hartenbower at (715) 225-4705 or Benjamin.Hartenbower@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (2) – Narrative & Map

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## Water Quality-Based Effluent Limitations for Ellsworth Wastewater Treatment Facility

**WPDES Permit No. WI-0021253**

Prepared by: Benjamin P. Hartenbower

### PART 1 – BACKGROUND INFORMATION

#### Facility Description

The Ellsworth Wastewater Treatment Facility is an oxidation ditch system with biological nutrient removal and chemical phosphorus removal. Disinfection is achieved with a UV system. The discharge is to the west bank of Isabelle Creek, 1/5 mile south of HWY 10 at NE ¼, NE ¼ Section 20 Town of Ellsworth, Pierce County.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

#### Existing Permit Limitations

The current permit, expiring on December 31, 2021, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD <sub>5</sub>			30 mg/L	20 mg/L		1,3
TSS			30 mg/L	20 mg/L		1,3
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1,3
Ammonia Nitrogen						
April	8.8 mg/L		<b>8.8 mg/L</b>	<b>8.8 mg/L</b>		4
May – September	11 mg/L		9.1 mg/L	3.6 mg/L		
October & November	8.8 mg/L		<b>8.8 mg/L</b>	<b>8.8 mg/L</b>		
December – March	7.8 mg/L		<b>7.8 mg/L</b>	<b>7.8 mg/L</b>		
Fecal Coliform				400#/100 mL geometric mean		1
Chloride			325 mg/L 1,130 lbs/day	<b>400 mg/L</b> <b>1,130 lbs/day</b>		4,5
Phosphorus						
Interim				1.0 mg/L		6
Final				0.225 mg/L	0.075 mg/L 0.22 lbs/day	
Total Nitrogen			10 mg/L			1
TKN, Nitrate+Nitrite						1,2

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Monitoring only.
3. These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
5. To protect groundwater, a weekly average chloride limit of 325 mg/L became effective on January 1, 2021.
6. A compliance schedule is in the current permit to meet the final WQBEL by December 31, 2025.

**Receiving Water Information**

- Name: Isabelle Creek
- Waterbody Identification Code (WBIC): 2445000
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Limited Aquatic Life (LAL) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: Due to the nature of the receiving water, the 7-Q<sub>10</sub>, 7-Q<sub>2</sub>, and Harmonic Mean are estimated to be zero.
  - 7-Q<sub>10</sub> = 0 cfs (cubic feet per second)
  - 7-Q<sub>2</sub> = 0 cfs
  - Harmonic Mean Flow = 0 cfs
- Downstream Low Flow: The following 7-Q<sub>10</sub> and 30-Q<sub>5</sub> values are from USGS for Station 05355267, where the classification changes to Warm Water sports fish community. These values are used to evaluate potential downstream ammonia impacts.
  - 7-Q<sub>10</sub> = 1.0 cfs (cubic feet per second)
  - 30-Q<sub>5</sub> = 1.6 cfs
- Hardness = 388 mg/L as CaCO<sub>3</sub>. Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they don't impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: The Ellsworth Co-Op Creamery also discharges to Isabelle Creek. The downstream impacts of both discharges are factored into the ammonia limit calculations.
- Impaired water status: Downstream of Isabelle Creek, Lake Pepin is listed as impaired for total phosphorus.

**Effluent Information**

- Design flow rate(s):  
Annual average = 0.358 MGD (Million Gallons per Day)  
Peak weekly = 0.789 MGD  
For reference, the actual average flow from 01/01/2017 to 07/31/2021 was 0.329 MGD.
- Hardness = 388 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of four effluent samples taken from data from 01/21/2021 to 02/01/2021 as submitted in the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic wastewater with water supply from wells.
- Additives: Alum is used to control phosphorus concentration in effluent.
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus hardness. The permit-required monitoring for ammonia, chloride, and phosphorus January 2017 to July 2021 is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
01/21/2021	3	02/04/2021	<3	02/18/2021	<3
01/25/2021	4	02/08/2021	3	02/22/2021	<3
01/28/2021	3	02/11/2021	<3	02/25/2021	<3
02/01/2021	6	02/15/2021	3		
Mean = <3 µg/L					

“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

	Chloride mg/L
1-day P <sub>99</sub>	512
4-day P <sub>99</sub>	404
30-day P <sub>99</sub>	344
Mean	313
Std	70.4
Sample size	238
Range	173 - 692

The following table presents the average concentrations and loadings at Outfall 001 from January 2017 to July, 2021 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

**Parameter Averages with Limits**

	Average Measurement	Average Mass Discharged
BOD <sub>5</sub>	8.7 mg/L*	
TSS	5.8 mg/L*	
pH field	7.06 s.u.	
Dissolved Oxygen	6.75	
Phosphorus	0.39 mg/L	
Ammonia Nitrogen	0.83 mg/L*	
Total Nitrogen	4.65 mg/L	
Chloride	313 mg/L	813 lbs/day
Fecal Coliform	66 #/100 mL	

\*Results below the level of detection (LOD) were included as zeroes in calculation of average.

## **PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN**

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99<sup>th</sup> percentile (or P<sub>99</sub>) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

### **Acute Limits based on 1-Q<sub>10</sub>**

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Adm. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q<sub>10</sub> receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Q<sub>s</sub> = average minimum 1-day flow which occurs once in 10 years (1-day Q<sub>10</sub>)

if the 1-day Q<sub>10</sub> flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q<sub>10</sub>).

Q<sub>e</sub> = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Attachment #1

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q<sub>10</sub> method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Ellsworth Wastewater Treatment Facility.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L).

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

RECEIVING WATER FLOW = 0 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P <sub>99</sub>	1-day MAX. CONC.
Arsenic		340	340	68.0	<1.0		
Cadmium	388	137	137	27.4	<3		
Chromium	301	4446	4446	889	<6		
Copper	388	56	56	11.2	<3		
Lead	356	365	365	72.9	<1		
Nickel	268	1080	1080	216	<8		
Zinc	333	345	345	68.9	60		
Chloride (mg/L)		757	757			512	692

\* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

\*\* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q<sub>10</sub> flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P <sub>99</sub>
Arsenic		152		152	30.4	<1.0	
Cadmium	175	3.82		3.82	0.76	<3	
Chromium	301	326		326	65.2	<6	
Copper	388	33.0		33.0	6.61	<3	
Lead	356	95.5		95.5	19.1	<1	
Nickel	268	169		169	33.8	<8	
Zinc	333	345		345	68.9	60	
Chloride (mg/L)		395		395			<b>404</b>

\* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

**Monthly Average Limits based on Wildlife Criteria (WC)**

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

**Monthly Average Limits based on Human Threshold Criteria (HTC)**

RECEIVING WATER FLOW = 0 cfs (1/4 of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	880		880	176	<3
Chromium (+3)	8400000		8400000	1680000	<6
Lead	2240		2240	448	<1
Nickel	110000		110000	22000	<8

**Monthly Average Limits based on Human Cancer Criteria (HCC)**

RECEIVING WATER FLOW = 0 cfs (1/4 of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	40		40	8.0	<1.0

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

**Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for chloride.

Chloride – Considering available effluent data from the current permit term (January 2017 to July 2021), the 1-day P<sub>99</sub> chloride concentration is 512 mg/L, and the 4-day P<sub>99</sub> of effluent data is 404 mg/L.

Because the 4-day P<sub>99</sub> exceeds the calculated weekly average WQBEL, an effluent limit is needed in accordance with s. NR 106.05(4)(b), Wis. Adm. Code. The Ellsworth Wastewater Treatment Facility is subject to the WQBEL of 400 mg/L as a weekly average, the weekly average mass limit of 1,194 lbs/day (400 mg/L × 0.358 MGD × 8.34), and an alternative wet weather mass limit of 2,632 lbs/day (400 mg/L × 0.789 MGD × 8.34).



### **Antidegradation**

The chloride limits are greater than the existing weekly average limit of 325 mg/L. This limit was originally intended as a permit requirement for groundwater protection due to the geologic environment of the discharge location. However, the 2021 groundwater evaluation does not recommend effluent limits based on the protection of groundwater. An assessment of the effluent data from January 2017 to July 2021 demonstrates that the discharge has been equal to or exceeded 85% of the weekly average effluent limitation of 325 mg/L for 4 consecutive weeks and the mass of chloride discharged has been equal to or exceeded the mass permit limitation of 1,130 lbs/day.

The water quality based weekly average chloride limit of 400 mg/L was calculated with no assimilative capacity, using a  $7Q_{10}$  of 0 cfs. As the 4-day  $P_{99}$  of 404 mg/L represents the currently achievable weekly average, increasing the discharge limit from 325 mg/L to 400 mg/L will not lower water quality from current conditions. Therefore, the comparison between the expected levels of chloride and levels at one-third assimilative capacity does not result in a significant lowering of water quality as defined in s. NR 207.05(4), Wis. Adm. Code and a review of pollution control alternatives under s. NR 207.04(d), Wis. Adm. Code is not needed.

If the Ellsworth Wastewater Treatment Facility would like to request an increase to the existing permit limits, a demonstration is needed that the remaining conditions in s. NR 207.04(1)(a)2 to 4, Wis. Adm. Code, have been met. This includes considerations for operations, maintenance and temporary upsets.

### **Antibacksliding**

The antibacksliding requirement in s. NR 207.12(2)(d), Wis. Adm. Code is met because the permittee has no control and no reasonably available remedy. The general requirement of s. NR 207.12(1)(b), Wis. Adm. Code is met when relaxing the best professional judgement (BPJ) limitation of 325 mg/L to a limit that complies with the state water quality standard of 400 mg/L.

Mercury – The permit application did not require monitoring for mercury because the Ellsworth Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from 2017 to 2020 was 0.38 mg/kg, with a maximum reported concentration of 0.50 mg/kg. Therefore, no mercury monitoring is recommended at Outfall 001.

## **PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN**

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum, weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- The maximum expected effluent pH has changed

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.633 and B = 90.0 for Limited Aquatic Life, and  
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1672 sample results were reported from January 2017 to July 2021. The maximum reported value was 9.96 s.u. (Standard pH Units). The effluent pH was 7.40 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.46 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.45 s.u. Therefore, a value of 7.46 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.46 s.u. into the equation above yields an ATC = 32.52 mg/L.

**Potential Changes to Daily Maximum Ammonia Nitrogen Effluent Limitations**

Subchapter IV of ch. NR 106, Wis. Adm. Code (effective September 1, 2016) specifies methods for the use of the 1-Q<sub>10</sub> receiving water low flow to calculate daily maximum ammonia nitrogen limits if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q<sub>10</sub> (estimated as 80 % of 7-Q<sub>10</sub>) and the 2×ATC approach are shown below.

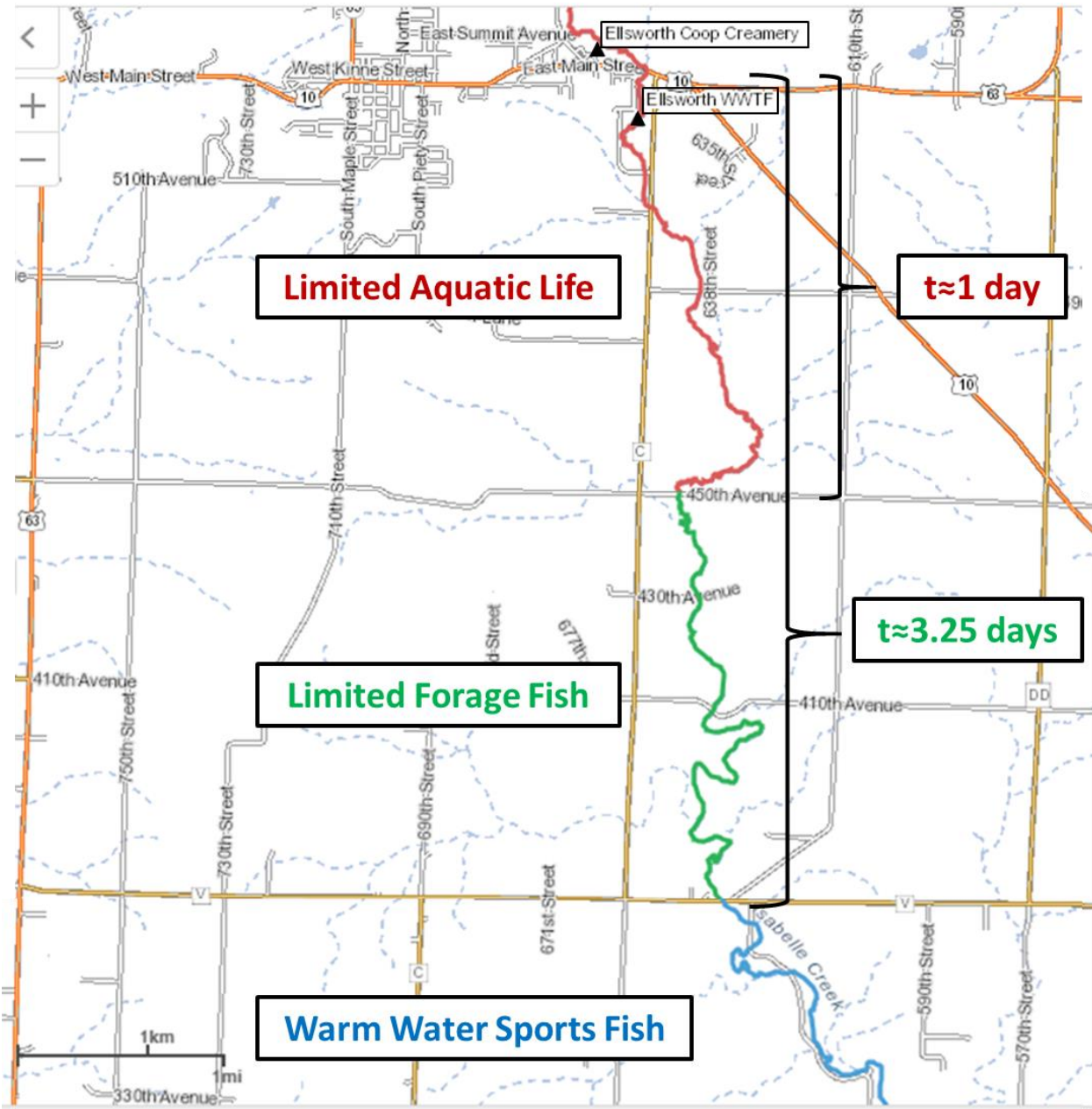
**Daily Maximum Ammonia Nitrogen Determination**

	Ammonia Nitrogen Limit mg/L
2×ATC	65
1-Q <sub>10</sub>	33

The 1-Q<sub>10</sub> method yields the most stringent limits for the Ellsworth Wastewater Treatment Facility.

**Downstream Classification**

The Department must establish limits to protect downstream uses, according to s. NR 106.32(1)(b), Wis. Adm. Code. The classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code changes from limited aquatic life to a limited forage fish community within 3 miles of the discharge location. Further downstream, the classification changes again to a warm water sports fish community.



$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Limited Forage Fishery

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

**Daily Maximum Ammonia Nitrogen Limits – WWSF, WWFF & LFF**

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq \text{pH} \leq 6.1$	54	$7.0 < \text{pH} \leq 7.1$	33	$8.0 < \text{pH} \leq 8.1$	6.9
$6.1 < \text{pH} \leq 6.2$	53	$7.1 < \text{pH} \leq 7.2$	30	$8.1 < \text{pH} \leq 8.2$	5.7
$6.2 < \text{pH} \leq 6.3$	52	$7.2 < \text{pH} \leq 7.3$	26	$8.2 < \text{pH} \leq 8.3$	4.7
$6.3 < \text{pH} \leq 6.4$	51	$7.3 < \text{pH} \leq 7.4$	23	$8.3 < \text{pH} \leq 8.4$	3.9
$6.4 < \text{pH} \leq 6.5$	49	$7.4 < \text{pH} \leq 7.5$	20	$8.4 < \text{pH} \leq 8.5$	3.2
$6.5 < \text{pH} \leq 6.6$	47	$7.5 < \text{pH} \leq 7.6$	17	$8.5 < \text{pH} \leq 8.6$	2.7
$6.6 < \text{pH} \leq 6.7$	45	$7.6 < \text{pH} \leq 7.7$	14	$8.6 < \text{pH} \leq 8.7$	2.2
$6.7 < \text{pH} \leq 6.8$	42	$7.7 < \text{pH} \leq 7.8$	12	$8.7 < \text{pH} \leq 8.8$	1.8
$6.8 < \text{pH} \leq 6.9$	39	$7.8 < \text{pH} \leq 7.9$	10	$8.8 < \text{pH} \leq 8.9$	1.6
$6.9 < \text{pH} \leq 7.0$	36	$7.9 < \text{pH} \leq 8.0$	8.4	$8.9 < \text{pH} \leq 9.0$	1.3

Stream pH data from the Isabelle Creek at 450<sup>th</sup> Avenue was used in place of effluent pH for the downstream ATC calculations. This is where the classification changes from LAL to LFF. The rationale for this approach is that by the time effluent discharged from both Ellsworth and Ellsworth Coop Creamery reaches 450<sup>th</sup> Avenue, there is a consistent increase in stream pH downstream. Under base flow conditions the stream is entirely effluent and it is appropriate to use stream pH as the basis for daily maximum limitations.

**In Stream pH data for Isabelle Creek**

Location	pH (s.u.)
450 <sup>th</sup> Avenue	8.11 (n=81)
County Hwy V	7.66 (n=81)

Stream pH data from the Isabelle Creek at County Highway V was used in chronic toxicity criteria (CTC) calculations at the classification change to WWSF.

The peak annual flow for Ellsworth Co-Op Creamery from 01/01/2017 to 08/31/2021 was 0.267 MGD. This value is added to Ellsworth Wastewater Treatment Facility annual design flow of 0.358 MGD to evaluate the downstream impacts from the combined discharge of 0.625 MGD. Previous calculations have estimated 0.223 MGD of stream flow to be lost to groundwater before reaching County Highway V. Therefore, a net total effluent flow of 0.402 MGD will be used for the chronic ammonia impacts at the downstream classification change to WWSF.

**Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)**

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, because those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Limited Aquatic Life is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

Attachment #1

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 1.0,

C =  $8.09 \times 10^{(0.028 \times (25 - T))}$

T = the temperature of the receiving (°C)

The 30-day CTC for ammonia in waters classified as a Limited Forage Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 1.0,

C = the minimum of 3.09 or  $3.73 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Present), or

C =  $3.73 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 – (Early Life Stages Absent)

The 30-day CTC for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Present), or

C =  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 – (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q<sub>10</sub> (4-Q<sub>3</sub>, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q<sub>5</sub> (estimated as 85% of the 7-Q<sub>2</sub> if the 30-Q<sub>5</sub> is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are believed to be present in Isabelle Creek, based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October-April (LFF segment) and October-December (WWSF Segment), and “ELS Present” criteria will apply from May through September (LFF segment) and January through September (WWSF segment).

Attachment #1

The “default” basin assumed values are used for Temperature and background ammonia concentrations, because minimum ambient data is available. These values are shown in the tables below, with the resulting criteria and effluent limitations.

**Weekly and Monthly Ammonia Nitrogen Limits – LAL**

		April	May – Sept.	Oct. – Dec.	Jan. – Mar.
<b>Effluent Flow</b>	Qe (MGD)	0.358	0.358	0.358	0.358
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0	0	0	0
	7-Q <sub>2</sub> (cfs)	0	0	0	0
	Ammonia (mg/L)	0	0	0	0
	Temperature (°C)	10	21	13	6
	pH (s.u.)	8.1	8.1	8.1	8.1
	% of Flow used	N/A	N/A	N/A	N/A
	Reference Weekly Flow (cfs)	0	0	0	0
	Reference Monthly Flow (cfs)	0	0	0	0
<b>Criteria mg/L</b>	4-day Chronic	45.06	22.82	37.67	57.90
	30-day Chronic	18.02	9.13	15.07	23.16
<b>Effluent Limits mg/L</b>	Weekly Average	45	23	38	58
	Monthly Average	18	9.1	15	23

**Weekly and Monthly Ammonia Nitrogen Limits – LFF**

		April	May – Sept.	Oct. – Dec.	Jan. – Mar.
<b>Effluent Flow</b>	Qe (MGD)	0.358	0.358	0.358	0.358
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0	0	0	0
	7-Q <sub>2</sub> (cfs)	0	0	0	0
	Ammonia (mg/L)	0	0	0	0
	Temperature (°C)	10	21	13	6
	pH (s.u.)	8.1	8.1	8.1	8.1
	% of Flow used	N/A	N/A	N/A	N/A
	Reference Weekly Flow (cfs)	0	0	0	0
	Reference Monthly Flow (cfs)	0	0	0	0
<b>Criteria mg/L</b>	4-day Chronic				
	Early Life Stages Present	6.54	6.54	6.54	6.54
	Early Life Stages Absent	20.78	10.52	17.37	26.70
	30-day Chronic				
	Early Life Stages Present	2.62	2.62	2.62	2.62
	Early Life Stages Absent	8.31	4.21	6.95	10.68
<b>Effluent Limitations mg/L</b>	Weekly Average				
	Early Life Stages Present		6.5		
	Early Life Stages Absent	21		17	27
	Monthly Average				
	Early Life Stages Present		2.6		
	Early Life Stages Absent	8.3		6.9	11

**Weekly and Monthly Ammonia Nitrogen Limits – WWSF**

		Spring	Summer	Fall	Winter
		April	May – Sept.	Oct. – Nov.	Dec. – Mar.
<b>Effluent Flow</b>	Qe (MGD)				
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	1.0	1.0	1.0	1.0
	30-Q <sub>5</sub> (cfs)	1.6	1.6	1.6	1.6
	Ammonia (mg/L)	0.1	0.1	0.1	0.1
	Temperature (°C)	9	21	10	3
	pH (s.u.)	7.7	7.7	7.7	7.7
	% of Flow used	25	100	25	25
	Reference Weekly Flow (cfs)	0.3	1.0	0.3	0.3
	Reference Monthly Flow (cfs)	0.4	1.6	0.4	0.4
<b>Criteria mg/L</b>	4-day Chronic				
	Early Life Stages Present	9.39	6.36	9.39	9.39
	Early Life Stages Absent	13.50	6.36	12.56	19.31
	30-day Chronic				
	Early Life Stages Present	3.76	2.54	3.76	3.76
	Early Life Stages Absent	5.40	2.54	5.03	7.72
<b>Effluent Limitations mg/L</b>	Weekly Average				
	Early Life Stages Present	13	16		13
	Early Life Stages Absent			18	
	Monthly Average				
	Early Life Stages Present	6	8.8		6
	Early Life Stages Absent			8	

**Ammonia Decay**

The Department must establish limits to protect downstream uses, according to s. NR 106.32(1)(b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32(4)(c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model should be used. Based on the available literature, a decay rate of 0.25 day<sup>-1</sup> at 20°C has been suggested as a default rate. A temperature correction factor of  $\theta = 1.08$  is ( $k_t = k_{20} \theta^{(T-20)}$ ). The ammonia nitrogen decay equation is provided below.

$$N_{\text{Limit}} = \left( \frac{N_{\text{down}}}{\text{EXP}(-k_t T)} \right)$$

Where:  $N_{\text{Limit}}$  = Ammonia limit needed to protect downstream use (mg/L)  
 $N_{\text{down}}$  = Ammonia limit calculated based on downstream classification and flow (mg/L)  
 $-k_t$  = Ammonia decay rate at background stream temperature (day<sup>-1</sup>)  
 $T$  = Travel time from outfall to downstream use (day)

Attachment #1

The velocity of receiving water is assumed to be 3 miles per day and the distance from the point of discharge to the classification change to LFF at 450<sup>th</sup> Avenue is approximately 3 miles for a travel time of one day. This equation shows that at the location where the classification changes, 81% of the ammonia is remaining from May to September and 89% during April. After decay, the limits are increased as shown in the following tables.

**Ammonia Nitrogen Decay Acute Limits Comparison**

	LAL	LFF	After decay	Current Limits
Months Applicable	Daily Maximum mg/L	Daily Maximum mg/L	Daily Maximum mg/L	Daily Maximum mg/L
April	33 mg/L	6.8 mg/L	7.6 mg/L	8.8 mg/L
May – September	33 mg/L	6.8 mg/L	8.4 mg/L	11 mg/L
October & November	33 mg/L	6.8 mg/L	6.8 mg/L	8.8 mg/L
December – March	33 mg/L	6.8 mg/L	6.8 mg/L	7.8 mg/L

**Ammonia Nitrogen Decay Chronic Limits Comparison (LFF)**

	LAL		LFF		After decay	
Months Applicable	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
April	45 mg/L	18 mg/L	21 mg/L	8.3 mg/L	23 mg/L	9.3 mg/L
May – September	23 mg/L	9.1 mg/L	6.5 mg/L	2.6 mg/L	8.1 mg/L	3.2 mg/L
October & November	38 mg/L	15 mg/L	17 mg/L	6.9 mg/L	17 mg/L	6.9 mg/L
December	38 mg/L	15 mg/L	17 mg/L	6.9 mg/L	17 mg/L	6.9 mg/L
January – March	58 mg/L	23 mg/L	27 mg/L	11 mg/L	27 mg/L	11 mg/L

The travel time from the point of discharge to the classification change to WWSF at County Highway V is approximately 3.25 days. The equation shows that at the location where the classification changes, 50% of the ammonia is remaining from May to September. After decay, the limits are increased as shown in the following table.

**Ammonia Nitrogen Decay Chronic Limits Comparison (WWSF)**

	WWSF		After decay		Current Limits	
Months Applicable	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
April	13 mg/L	6.1 mg/L	13 mg/L	6.1 mg/L	8.8 mg/L	8.8 mg/L
May – September	16 mg/L	8.8 mg/L	33 mg/L	18 mg/L	9.1 mg/L	3.6 mg/L
October & November	18 mg/L	8.2 mg/L	18 mg/L	8.2 mg/L	8.8 mg/L	8.8 mg/L
December	18 mg/L	8.2 mg/L	18 mg/L	8.2 mg/L	8.8 mg/L	8.8 mg/L
January – March	13 mg/L	6.1 mg/L	13 mg/L	6.1 mg/L	7.8 mg/L	7.8 mg/L

### Effluent Data

The following table evaluates the statistics based upon ammonia data reported from January 2017 to July 2021, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Ellsworth Wastewater Treatment Facility permit for the respective month ranges. That need is determined by calculating 99<sup>th</sup> upper percentile (or P<sub>99</sub>) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.



Ammonia Nitrogen mg/L	April	May – Sept.	Oct. & Nov.	December	Jan. – Mar.
1-day P <sub>99</sub>	11.3	4.2	N/A	N/A	12.4
4-day P <sub>99</sub>	6.3	2.3	N/A	N/A	6.7
30-day P <sub>99</sub>	3.3	0.9	N/A	N/A	3.3
Mean*	2.1	0.2	<0.1	<0.1	1.9
Std	2.4	2.0	N/A	N/A	2.8
Sample size	22	100	35	16	67
Range	<0.1 - 6.5	<0.1 - 8.5	<0.1 – 0.1	<0.1 – 0.1	<0.1 - 10.9

\*Values lower than the level of detection were substituted with a zero

The permit currently has daily, weekly, and monthly limits for all months. Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

(b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

### Expression of Limits

Revisions to ch. NR 106, Wis. Adm. Code, in September 2016 aligned Wisconsin's WQBELs with 40 CFR § 122.45(d), which specifies that effluent limits for continuous dischargers must be expressed as weekly and monthly averages for publicly owned treatment works and as daily maximums and monthly averages for all other dischargers, unless shown to be impracticable. Because a daily maximum ammonia limit is necessary for the Ellsworth Wastewater Treatment Facility, weekly and monthly average limits are also required under this code revision.

The methods for calculating limitations for municipal treatment facilities to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), Wis. Adm. Code, and are as follows:

Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.

In this case, the recommended daily maximum limits for October through April are more restrictive than the calculated weekly limits. Daily maximum limits for October through December are more restrictive than the calculated monthly limits. Therefore, **monthly and weekly average limits** for these respective month ranges are set equal to the daily maximum limits.

### Conclusions and Recommendations

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

**Final Ammonia Nitrogen Limits**

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April	7.6	<b>7.6</b>	6.1
May– September	8.4	8.1	3.2
October – December	6.8	<b>6.8</b>	<b>6.8</b>
January – March	6.8	<b>6.8</b>	6.1

**PART 4 – PHOSPHORUS****Technology-Based Effluent Limit**

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because the Ellsworth Wastewater Treatment Facility currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

In addition, the need for a WQBEL for phosphorus must be considered.

**Water Quality-Based Effluent Limits (WQBEL)**

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Phosphorus criteria in s. NR 102.06, Wis. Adm. Code, do not apply to limited aquatic life waters as described in s. NR 102.06(6)(d), Wis. Adm. Code. These waters were not included in the USGS/WDNR stream and river studies and, therefore, the Department lacked the technical basis to determine and propose applicable criteria. At some time in the future, the Department may adopt phosphorus criteria based on new studies focusing on limited aquatic life waters. The Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges (2020) suggests that during the interim, WQBELs should be based on the criteria and flow conditions for the next stream segment downstream (or downstream lake or reservoir, if appropriate), because ss. 217.12 and 217.13, Wis. Adm. Code, state that the Department must set WQBELs to protect downstream waters. The discharge location of the wastewater from the Ellsworth Wastewater Treatment Facility is classified as limited aquatic life downstream from the point of discharge downstream approximately 3 miles where the classification of Isabelle Creek changes to limited forage fish. Further downstream at County Hwy V, Isabelle Creek is classified for warm water sport fishery uses. The applicable phosphorus criterion is 0.075 mg/L.

**Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from January 2017 to July 2021.

**Total Phosphorus Effluent Data**

	Phosphorus mg/L
1-day P <sub>99</sub>	1.94
4-day P <sub>99</sub>	1.06
30-day P <sub>99</sub>	0.59
Mean	0.39
Std	0.40
Sample size	709
Range	0.05 - 6.13

**Reasonable Potential Determination**

The calculated WQBEL of 0.075 mg/L is less than the current technology-based limit of 1.0 mg/L, so the WQBEL must be included in the permit per s. NR 217.15(2), Wis. Adm. Code.

In accordance with s. NR 217.15(1), Wis. Adm. Code, there is reasonable potential for the discharge to cause or contribute to an exceedance of the water quality criteria.

**Limit Expression**

According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

**Mass Limits**

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is upstream of Lake Pepin, which is a phosphorus impaired water. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.358 MGD = 0.22 lbs/day expressed as a six-month average.**

**Multi-Discharge Variance Interim Limit**

With the permit application, the Village of Ellsworth has applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL for this permit term. The recommended interim limit, pursuant to s. 283.16 (6) 1, Wis. Stats., is 0.8 mg/L as a monthly average. A compliance schedule may be appropriate to meet this interim limit, but compliance with 0.8 mg/L shall be no later than the end of the reissued permit.

The effluent data indicates that the peak monthly average of **0.9 mg/L is a level currently achievable (LCA)** for the discharge. A limit of 0.9 mg/L as a monthly average should not be exceeded during the compliance schedule.

## PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in Chapters NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as Limited Aquatic Life according to s. NR 104.02(3)(b)1, Wis. Adm. Code, except for those classified as wastewater effluent channels and wetlands regulated under ch. NR 103 and described in s. NR 106.55(2), Wis. Adm. Code, which has a daily maximum effluent temperature limitation of 120 °F. The 86 °F limit applies because the hydrologic classification is not listed as wetland in ch. NR 104, Wis. Adm. Code.

### Reasonable Potential

Based on the available discharge temperature data shown below, from February 2008 to November 2008 the maximum daily effluent temperature reported was 69°F; therefore, no reasonable potential for exceeding the daily maximum limit exists, and **no limits or monitoring are recommended.**

**Monthly Temperature Effluent Data & Limits**

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	-	-	-	86
FEB	45	47	-	86
MAR	46	46	-	86
APR	50	50	-	86
MAY	56	56	-	86
JUN	63	64	-	86
JUL	67	67	-	86
AUG	68	68	-	86
SEP	66	69	-	86
OCT	62	64	-	86
NOV	61	61	-	86
DEC	-	-	-	86

**PART 6 – WHOLE EFFLUENT TOXICITY (WET)**

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (October 29, 2019)*.

Guidance in Chapter 1.11 of the WET Guidance Document (WET Testing of Minor Municipal Discharges) was consulted. This is a minor municipal discharge (< 1.0 MGD) comprised solely of domestic wastewater, with no history of WET failures and no toxic compounds detected at levels of concern. No WET testing is recommended at this time because of the low risk in effluent toxicity.

